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Trinidad Lake
Henderson County, Texas

National Eutrophication Survey, Corvallis, Oreg

Prepared for:

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U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY
WORKING PAPER SERIES

CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY - CORVALLIS, OREGON
and
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Report
on
Trinidad Lake
Henderson County
Texas
EPA Region VI
Working Paper No. 665

With the cooperation of the
Texas Water Quality Board
and the
Texas National Guard
March, 1977

CONTENTS

	Page
Foreward	ii
List of Texas Study Reservoirs	iv
Lake and Drainage Area Map	vi
Sections	
I. Introduction	1
II. Conclusions	1
III. Lake and Drainage Basin Characteristics	3
IV. Lake Water Quality Summary	4
V. Literature Reviewed	10
VI. Appendices	11

FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations of the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGEMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Texas Water Quality Board for professional involvement, to the Texas National Guard for conducting the tributary sampling phase of the Survey, and to those Texas wastewater treatment plant operators who voluntarily provided effluent samples.

Hugh C. Yantis, Jr., Executive Director of the Texas Water Quality Board, and John B. Latchford, Jr., Director, and the staff of the Field Operations Division provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

Major General Thomas Bishop, the Adjutant General of Texas, and Project Officer Colonel William L. Seals, who directed the volunteer efforts of the Texas National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

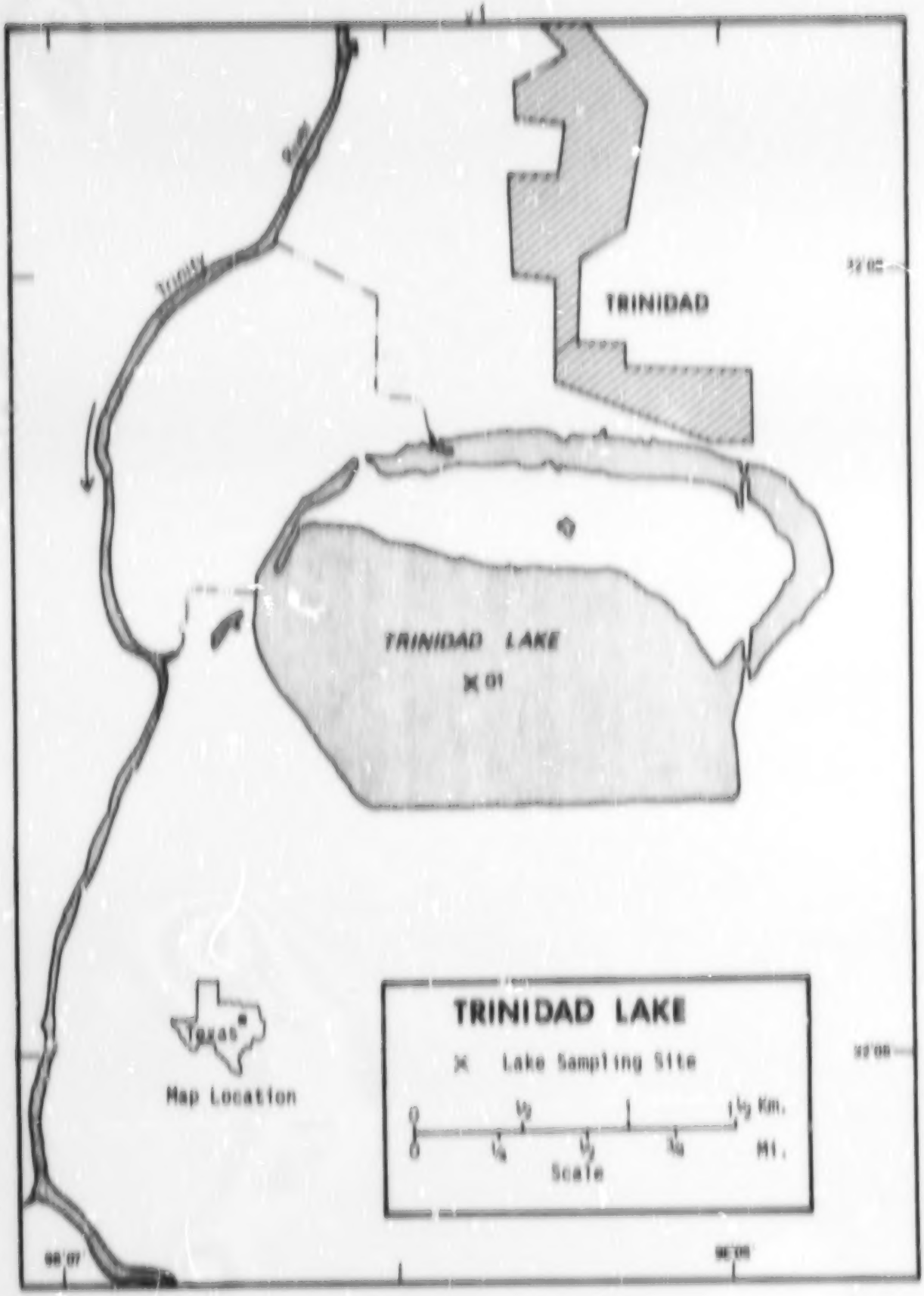
NATIONAL EUTROPHICATION SURVEY

STUDY RESERVOIRS

State of Texas

NAME	COUNTY
Amistad	Val Verde
Bastrop	Bastrop
Belton	Bell, Coryell
Braunig	Bexar
Brownwood	Brown
Buchanan	Burnet, Llano
Caddo	Harrison, Marion, TX; Caddo Parish, LA
Calaveras	Bexar
Canyon	Comal
Colorado City	Mitchell
Corpus Christi	Jim Wells, Live Oak, San Patricio
Diversion	Archer, Baylor
Eagle Mountain	Tarrant, Wise
Fort Phantom Hill	Jones
Houston	Harris
Kemp	Baylor
Lake O'The Pines	Camp, Marion, Morris, Upshur
Lavon	Collin
Lewisville (Garza-Little Elm)	Denton
Livingston	Polk, San Jacinto, Trinity, Walker

Lyndon B. Johnson	Burnet, Llano
Medina	Bandera, Medina
Meredith	Hutchinson, Moore, Potter
O. C. Fisher (San Angelo)	Tom Green
Palustine	Anderson, Cherokee, Henderson, Smith
Possum Kingdom	Palo Pinto, Stephens, Young
Sam Rayburn	Angelina, Jasper Nacogdoches, Sabine, San Augustine
Somerville	Burleson, Lee, Washington
E. V. Spence	Coke
Stamford	Haskell
Stillhouse Hollow	Bell
Tawakoni	Hunt, Rains, Van Zandt
Texoma	Cooke, Grayson TX; Bryan, Johnston, Love, Marshall, OK
Travis	Burnet, Travis
Trinidad	Henderson
Twin Buttes	Tom Green
White River	Crosby
Whitney	Bosque, Hill
Wright Patman (Texarkana)	Bowie, Cass


TRINIDAD
TRINIDAD LAKE
01
Texas
Map Location
TRINIDAD LAKE
Lake Sampling Site
½
1½ Km.
0
¼
½
¾
Mi.
Scale

TRINIDAD LAKE

STORET NO. 4836

I. INTRODUCTION

Trinidad Lake was included in the National Eutrophication Survey as a water body of interest to the Texas Water Quality Board. Tributaries and nutrient sources were not sampled, and this report relates only to the lake sampling data.

Trinidad Lake, built in 1925, is owned by the Texas Power and Light Company. Located immediately south of Trinidad, Texas, it is used as a source of cooling water for power generation. The lake level is maintained by diversion of water from the Trinity River (Wyatt, 1975).

II. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Trinidad Lake is eutrophic; i.e., well supplied with nutrients and quite productive. Whether nutrient enrichment is beneficial or deleterious depends on the actual or potential effect on the uses of the lake. In this regard, no nuisance conditions are known to personnel of the Texas Water Quality Board and there is little or no impairment of the designated beneficial uses of this water body.

Trinidad Lake ranked thirty-fifth in overall trophic quality when the 39 Texas reservoirs sampled in 1974 were compared using a combination of six parameters*. All of the other water bodies had less median total and dissolved phosphorus, 14 had less and two had the same median inorganic nitrogen, 36 had less mean chlorophyll a, and 34 had greater mean Secchi disc transparency.

* See Appendix A.

Survey limnologists noted that the lake was extremely turbid in March and reported emergent macrophytes in the shoreline shallows in November.

B. Rate-Limiting Nutrient:

The algal assay results indicate that primary productivity in Trinidad Lake was nitrogen-limited at the times the samples were collected (03/11/74 and 11/01/74). The lake data indicate nitrogen limitation at all sampling times.

III. LAKE CHARACTERISTICS[†]

A. Lake Morphometry[††]:

1. Surface area: 2.99 kilometers^2.
2. Mean depth: 3.1 meters.
3. Maximum depth: >2.4 meters.
4. Volume: 9.269×10^6 m^3.

B. Precipitation*:

1. Year of sampling: 120.8 centimeters.
2. Mean annual: 117.4 centimeters.

† Table of metric equivalents--Appendix B.
†† Latchford, 1975.
* See Working Paper No. 175, "...Survey Methods, 1973-1976".

IV. LAKE WATER QUALITY SUMMARY

Trinidad Lake was sampled four times during 1974 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from two or more depths at one station on the lake (see map, page vi). During each visit, a single depth-integrated (near bottom to surface) sample was collected for phytoplankton identification and enumeration; and a similar sample was taken for chlorophyll a analysis. During the March and November visits, single 18.9-liter depth-integrated samples were collected for algal assays. The maximum depth sampled was 2.4 meters.

The sampling results are presented in full in Appendix C and are summarized in the following table (nutrient samples collected in August were not preserved properly and were not analyzed).

A SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR MONITORING
STUDY CODE 439

PARAMETER	1ST SAMPLING : 3/11/94			2ND SAMPLING : 5/17/94			3RD SAMPLING : 8/10/94		
	5 SITES			5 SITES			5 SITES		
	RANGE	MEAN	MEDIAN	RANGE	MEAN	MEDIAN	RANGE	MEAN	MEDIAN
TEMP (C)	22.7 - 23.6	23.1	23.1	25.0 - 25.9	25.5	25.5	31.6 - 32.8	31.3	31.5
DISS OXY (MG/L)	7.8 - 7.8	7.8	7.8	5.8 - 5.8	5.8	5.8	7.4 - 10.4	8.5	10.2
CNDCTVY (MCHOMS)	985. - 985.	985.	985.	1011. - 1038.	1028.	1028.	1237. - 1266.	1246.	1252.
PH (STAND UNITS)	6.8 - 6.9	6.8	6.8	6.6 - 6.8	6.7	6.7	6.8 - 7.1	6.9	6.9
TOT ALK (MG/L)	280. - 288.	284.	284.	251. - 283.	281.	275.	----	----	----
TOT P (MG/L)	0.292 - 0.295	0.294	0.295	0.392 - 0.467	0.429	0.429	----	----	----
ORTHO P (MG/L)	0.087 - 0.095	0.091	0.091	0.225 - 0.334	0.284	0.284	----	----	----
NO2+3 (MG/L)	0.078 - 0.080	0.079	0.079	0.058 - 0.076	0.068	0.070	----	----	----
AMMONIA (MG/L)	0.068 - 0.073	0.070	0.070	0.048 - 0.070	0.055	0.055	----	----	----
KJEL N (MG/L)	1.788 - 2.000	1.894	1.894	1.988 - 2.188	2.088	2.088	----	----	----
INORG N (MG/L)	0.138 - 0.146	0.142	0.142	0.098 - 0.151	0.125	0.125	----	----	----
TOTAL N (MG/L)	1.788 - 2.000	1.894	1.894	1.988 - 2.188	2.088	2.088	----	----	----
CHLOPHYL A (UG/L)	2.3 - 2.3	2.3	2.3	3.4 - 3.4	3.4	3.4	27.4 - 27.4	27.4	27.4
SECCHI (METERS)	8.3 - 8.3	8.3	8.3	8.4 - 8.4	8.4	8.4	8.4 - 8.5	8.4	8.4

A SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR MONTH
STREET CODE 4636

<4> SAMPLING YEAR 1/74

PARAMETER	1 SITES RANGE	MEAN	MEDIAN
TEMP (C)	24.5 - 24.6	24.6	24.6
OXYGEN (MG/L)	8.6 - 8.8	8.7	8.7
CONDUCTIVITY (MICROMHO)	1831. - 1831.	1832.	1832.
PH (STAND UNITS)	8.9 - 8.9	8.9	8.9
TOT ALK (MG/L)	211. - 216.	214.	214.
TOT P (MG/L)	0.396 - 0.457	0.426	0.426
DIFFUS P (MG/L)	0.255 - 0.321	0.288	0.288
NO2+NO3 (MG/L)	0.420 - 0.430	0.425	0.425
AMMONIA (MG/L)	0.350 - 0.361	0.355	0.355
KJEL N (MG/L)	1.488 - 1.488	1.788	1.788
INORG N (MG/L)	0.870 - 0.890	0.880	0.880
TOTAL N (MG/L)	1.622 - 1.638	1.725	1.725
CHLOPHYL A (UG/L)	32.0 - 32.0	32.0	32.0
SECCHI (METERS)	0.0 - 0.0	0.0	0.0

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
03/11/74	1. Scenedesmus sp.	13,306
	2. Cosmarium sp.	11,416
	3. Centric diatoms	10,926
	4. Golenkinia sp.	7,214
	5. Nitzschia sp.	3,082
	Other genera	11,415
	Total	57,359
06/17/74	1. Dactylococcopsis sp.	3,752
	2. Golenkinia sp.	2,047
	3. Scenedesmus sp.	1,933
	4. Cyclotella sp.	1,402
	5. Merismopedia sp.	1,213
	Other genera	5,229
	Total	15,576
08/12/74	1. Merismopedia sp.	7,045
	2. Lyngbya sp.	6,818
	3. Nitzschia sp.	4,821
	4. Scenedesmus sp.	3,720
	5. Cyclotella sp.	3,444
	Other genera	14,395
	Total	40,223
11/01/74	1. Ankistrodesmus sp.	6,583
	2. Scenedesmus sp.	5,596
	3. Nitzschia sp.	3,950
	4. Merismopedia sp.	3,456
	5. Kirchneriella sp.	3,127
	Other genera	12,014
	Total	34,726

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (ug/l)
03/11/74	1	2.3
05/17/74	1	34.9
08/12/74	1	27.4
11/01/74	1	32.6

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

a. March sample -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.015	0.059	6.0
0.050 P	0.065	0.059	6.9
0.050 P + 1.0 N	0.065	1.059	21.9
1.0 N	0.015	1.059	19.1

b. November sample -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.270	0.113	4.4
0.050 P	0.320	0.113	4.2
0.050 P + 1.0 N	0.320	1.113	22.7
1.0 N	0.270	1.113	22.1

2. Discussion -

The control yields of the assay alga, Selenastrum capricornutum, indicate that the potential primary productivity

of Trinidad Lake was moderately high at the times the assay samples were collected (03/11/74 and 11/01/74). Also, the increase in yield when nitrogen alone was added and the lack of significant increase when only orthophosphorus was added indicate the lake was nitrogen limited at those times.

The lake data also indicate nitrogen limitation; i.e., the mean inorganic nitrogen/orthophosphorus ratios were 2/1 or less at all sampling times, and nitrogen limitation would be expected.

V. LITERATURE REVIEWED

Latchford, John B., Jr., 1974. Personal communication (lake morphometry). TX Water Qual. Bd., Austin.

Wyatt, Linda B., 1975. Personal communication (general lake information). TX Water Qual. Bd., Austin.

11

VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE INCLUDED IN REPORT

LAKE CODE	LAKE NAME	[illegible] TOTAL *	[illegible] [illegible] *	[illegible] [illegible]	[illegible]	[illegible]	[illegible] [illegible] *
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] RESERVOIR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LAKE [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] RESERVOIR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LAKE [illegible] CITY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] [illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] MOUNTAIN LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	FT [illegible] HILL LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LITTLE ELM RESERVO	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LAKE OF THE PINES	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] RESERVOIR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] B [illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LAKE [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] RESERVOIR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] RESERVOIR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] RESERVOIR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	E [illegible] SPENCE RESERVOIR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

LAKE Data TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	[illegible] TOTAL P	[illegible] INDIV %	SDF [illegible] SEC	[illegible] CHLOR	Zv [illegible] M	[illegible] 2035 DATA?
[illegible]	SOMERVILLE LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	STAMFORD LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	STILLHOUSE HOLLOW RESER	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TAWAKONI LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TEXARKANA LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TEXOMA LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TRAVIS LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TROPICAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TWIN BUTTES RESERVOIR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	WHITE KING RESERVOIR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	WHITNEY LAKE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] OF LAKES WITH MISSING VALUES [illegible] OF LAKES WITH FLAGGED VALUES

LAKE CODE	LAKE NAME	[illegible] TOTAL P	[illegible] INORG N	[illegible] [illegible] SEC	[illegible] CHLOR	[illegible] [illegible]	[illegible] [illegible] P	[illegible] [illegible]
4001	[illegible] LAKE	45 (3%)	5 (2)	188 (9%)	138 (7%)	39 (3%)	63 (2%)	482
4002	[illegible] LAKE	76 (3%)	74 (2%)	62 (3%)	47 (1%)	17 (0)	62 (3%)	343
4003	[illegible] RESERVOIR	62 (3%)	24 (1%)	97 (4%)	68 (2%)	17 (0)	84 (3%)	394
4004	[illegible] LAKE	5 (2)	42 (1%)	58 (2%)	0 (0)	48 (1%)	5 (2)	154
4005	[illegible] LAKE	66 (2%)	78 (2%)	29 (1%)	87 (2%)	58 (2%)	84 (3%)	394
4006	LAKE [illegible]	47 (1%)	21 (1%)	74 (2%)	63 (2%)	17 (0)	59 (2%)	261
4007	[illegible] LAKE	24 (1%)	91 (3%)	42 (1%)	32 (1%)	76 (2%)	38 (1%)	297
4008	[illegible] LAKE	45 (1%)	158 (5%)	47 (1%)	11 (0)	67 (2%)	92 (3%)	362
4009	[illegible] RESERVOIR	98 (3%)	8 (0)	95 (3%)	47 (1%)	48 (1%)	67 (3%)	446
4010	LAKE [illegible] CITY	39 (1%)	76 (2%)	26 (1%)	42 (1%)	88 (3%)	38 (1%)	318
4011	[illegible] CRYSTAL LAKE	8 (0)	47 (1%)	16 (1%)	13 (0)	61 (2%)	0 (0)	145
4012	[illegible] LAKE	68 (2%)	63 (2%)	32 (1%)	29 (1%)	97 (3%)	63 (2%)	372
4013	EAGLE [illegible] LAKE	71 (2%)	91 (3%)	34 (1%)	78 (2%)	78 (3%)	76 (2%)	428
4014	FT PHANTOM HILL LAKE	24 (1%)	66 (2%)	21 (1%)	74 (2%)	65 (2%)	24 (1%)	274
4015	GARZA LITTLE ELM RESERVO	34 (1%)	13 (0)	18 (1%)	34 (1%)	55 (2%)	21 (1%)	173
4016	HOOP LAKE	74 (2%)	91 (3%)	55 (2%)	55 (2%)	84 (3%)	92 (3%)	423
4017	[illegible] LAKE	18 (0)	16 (0)	8 (0)	24 (1%)	72 (2%)	11 (0)	139
4018	LAKE OF THE PINES	54 (2%)	76 (2%)	66 (2%)	38 (1%)	17 (0)	46 (1%)	314
4019	LAVON RESERVOIR	21 (0)	29 (1%)	3 (0)	84 (3%)	188 (6%)	21 (1%)	256
4020	LIVINGSTON LAKE	3 (0)	3 (0)	38 (1%)	26 (1%)	17 (0)	3 (0)	90
4021	LYNDON B JOHNSON LAKE	38 (1%)	11 (0)	53 (2%)	66 (2%)	38 (1%)	38 (1%)	234
4022	MEDINA LAKE	94 (3%)	8 (0)	99 (3%)	37 (1%)	17 (0)	188 (6%)	342
4023	LAKE MERIDITH	62 (3%)	91 (3%)	71 (2%)	45 (1%)	35 (1%)	63 (2%)	445
4024	PALESTINE LAKE	54 (2%)	32 (1%)	63 (2%)	53 (2%)	48 (1%)	51 (1%)	362
4025	POSSUM KINGDOM RESERVOIR	74 (2%)	91 (3%)	84 (3%)	58 (2%)	17 (1)	63 (2%)	387
4026	SAN ANGELO RESERVOIR	13 (0)	45 (1%)	8 (0)	8 (0)	88 (3%)	48 (1%)	211
4027	SAN ANTONIO RESERVOIR	59 (2%)	39 (1%)	68 (2%)	76 (2%)	17 (0)	63 (2%)	322
4028	E O SPENCE RESERVOIR	58 (2%)	63 (3%)	45 (1%)	58 (2%)	17 (0)	76 (2%)	321

PERCENT OF LAKES WITH HIGHER VALUES NUMBER OF LAKES WITH HIGHER VALUES

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	SUM- MEAN SEC	MEAN CHLORA	25+ MEAN 30	MEDIAN DISS ORTHO P	TRUES MEAN
4429	SOMERVILLE LAKE	29 (113)	55 (233)	24 (90)	3 (13)	67 (253)	38 (151)	254
4430	STAMFORD LAKE	18 (71)	47 (177)	5 (21)	16 (71)	62 (237)	39 (144)	254
4431	STILLHOUSE HOLLOW RESERV	68 (233)	37 (144)	67 (233)	42 (156)	17 (67)	51 (199)	372
4432	TAWAKONI LAKE	32 (123)	78 (289)	37 (144)	21 (89)	63 (244)	38 (151)	263
4433	TEXARKANA LAKE	11 (44)	52 (194)	13 (56)	16 (64)	72 (278)	13 (56)	176
4434	TEXOMA LAKE	39 (144)	34 (133)	61 (233)	45 (177)	17 (89)	21 (71)	217
4435	TRAVIS LAKE	68 (233)	21 (71)	42 (156)	62 (233)	17 (89)	34 (133)	384
4436	TWIN BUTTES RESERVOIR	54 (233)	21 (71)	58 (233)	61 (233)	46 (177)	63 (251)	311
4438	WHITE KING RESERVOIR	84 (329)	61 (233)	76 (296)	89 (344)	17 (89)	63 (251)	346
4439	WHITNEY LAKE	63 (244)	52 (194)	79 (306)	71 (278)	17 (89)	76 (296)	357

Rank	LAKE CODE	LAKE NAME	INDEX NO
1	[illegible]	CANYON RESERVOIR	[illegible]
2	[illegible]	LAKE [illegible]	[illegible]
3	[illegible]	EAGLE MOUNTAIN LAKE	[illegible]
4	[illegible]	[illegible] LAKE	[illegible]
5	[illegible]	[illegible] LAKE	[illegible]
6	[illegible]	[illegible] LAKE	[illegible]
7	[illegible]	[illegible] LAKE	[illegible]
8	[illegible]	WHITE ROCK RESERVOIR	[illegible]
9	[illegible]	[illegible] RESERVOIR	[illegible]
10	[illegible]	TRAVIS LAKE	[illegible]
11	[illegible]	BELTON RESERVOIR	[illegible]
12	[illegible]	STILLHOUSE HOLLOW RESERV	[illegible]
13	[illegible]	DIVERSION LAKE	[illegible]
14	[illegible]	COLORADO LAKE	[illegible]
15	[illegible]	WHITNEY LAKE	[illegible]
16	[illegible]	MEDINA LAKE	[illegible]
17	[illegible]	SAN ANTONIO RESERVOIR	[illegible]
18	[illegible]	E O SPENCE RESERVOIR	[illegible]
19	[illegible]	TWIN BUTTES RESERVOIR	[illegible]
20	[illegible]	LAKE COLORADO CITY	[illegible]
21	[illegible]	PALESTINE LAKE	[illegible]
22	[illegible]	LAKE OF THE PINES	[illegible]
23	[illegible]	CADDO LAKE	[illegible]
24	[illegible]	FT PHANTOM HILL LAKE	[illegible]
25	[illegible]	LAKE SOMERVILLE	[illegible]
26	[illegible]	STAMFORD LAKE	[illegible]
27	[illegible]	LAVON RESERVOIR	[illegible]
28	[illegible]	TAWAKONI LAKE	[illegible]

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
29	4421	LYNDON B JOHNSON LAKE	230
30	4424	TEXOMA LAKE	217
31	4425	SOMERVILLE LAKE	204
32	4426	SAN ANGELO RESERVOIR	200
33	4433	TOMAHAWK LAKE	176
34	4435	GARZA LITTLE ELM RESERVO	173
35	4436	TRINIDAD	164
36	4464	BRANDS LAKE	159
37	4511	CANYON CREST LAKE	155
38	4517	HOUSTON LAKE	139
39	4528	LIVINGSTON LAKE	91

APPENDIX B

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

PHYSICAL and CHEMICAL DATA

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Report on Trinidad Lake, Henderson County, Texas		5. REPORT DATE Prepared March 1977 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Anonymous (National Eutrophication Survey Staff)		8. PERFORMING ORGANIZATION REPORT NO. Working Paper # 865
9. PERFORMING ORGANIZATION NAME AND ADDRESS National Eutrophication Survey U.S. Environmental Protection Agency 200 S. W. 35th St. Corvallis, Oregon 97330		10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS Office of Research and Development U.S. Environmental Protection Agency 401 M Street, S. W. Washington, DC 20460		13. TYPE OF REPORT AND PERIOD COVERED Final - 1974 14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

Prepared in cooperation with the U.S. Environmental Protection Agency, National Environmental Research Center, Las Vegas, Nevada 89114

16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
eutrophication lakes nutrients phosphorus nitrogen loading		07B 06C
18. DISTRIBUTION STATEMENT Release unlimited	19. SECURITY CLASS (This Report) 20. SECURITY CLASS (This Page)	21. NO. OF PAGES 22. PRICE

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